

INTEGRATED CIRCUIT DEVICE CONTACT PLUGS HAVING A LINER LAYER
THAT EXERTS COMPRESSIVE STRESS THEREON AND METHODS OF
MANUFACTURING SAME

Abstract of the Disclosure

An integrated circuit device includes a substrate and an insulating layer that is disposed on the substrate and has a gap or hole formed therein. A liner layer that exhibits compressive stress characteristics is disposed on the sidewalls of the insulating layer, which define the gap, and also on the substrate in the gap. A contact plug that exhibits tensile stress characteristics is disposed on the liner layer. The compressive stress of the liner layer may reduce the tensile stress of the contact plug. Therefore, despite the tensile stress exhibited by the contact plug, the combination of the liner layer with the contact plug may inhibit the formation of cracks in the contact plug and/or in an interlayer dielectric film around the contact plug.

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